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ABSTRACT

The features of two currently popular evaluation models for higher education institutions are described. Each system was designed and developed to respond to what was perceived as different sides of a common problem. Two lines of analysis on costs and outcomes have been developed by the National Center for Higher Education Management (NCHEMS). The NCHEMS approach has focused only recently on outcomes for students and others. In comparison, the Program Effectiveness and Related Costs (PERC) approach begins with questions about program costs and program effectiveness and then asks about program costs. The strengths and weaknesses for institutional decision makers in selecting one or the other, or some combination of the approaches are presented. Areas of comparison between NCHEMS and PERC considered include: longitudinal and cross-sectional data, qualitative and quantitative data, individual and aggregate data, and reports written for general audiences and those tailored to separate audiences. A framework for viewing NCHEMS and PERC includes the following capabilities: evaluation intent, academic program operation, faculty roles in student learning, student diversity, range of data collected, performance standards, outcome-costs relationships; application experience, computer system support, and flexibility to new program formats. (SW)

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PERC and NCHEMS: A COMPARISON

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INTRODUCTION

Great pressures exist in higher education today to provide more sophisticated and comprehensive data on academic institutions and their performance. In response to these pressures, two systems of accountability obtain increasing attention. Each system was designed and developed to respond to what was perceived as different sides of a common problem. NCHEMS arose when the strategy to accountability stressed cost comparisons. Only recently has this approach focused on outcomes for students and others. By comparison, PERC arose when state officials and institutional administrators began to realize the shortcoming of a "cost-only" approach to accountability. PERC begins with questions about program outcomes and program effectiveness, and then asks about program costs.

These are a few of the more general points of comparison between PERC and NCHEMS. Several other areas will also be covered including: longitudinal and cross-sectional data, qualitative and quantitative data, individual and aggregate data, data for individual institutions and interinstitutional comparisons, reports written for general audiences and those tailored to separate audiences.

The key to the paper is the strengths and weaknesses for institutional decision makers in selecting one, or the other, or some combination of the approaches.

TWO "EVALUATION" SYSTEMS -- CAPSULE VIEWS

NCHEMS - Essence and Origin

NCHEMS - National Center for Higher Education Management Systems (Boulder, Co.). NCHEMS has developed two, more or less, independent lines of analysis on costs and outcomes.

An Introduction to the Identification and Uses of Higher Education Outcome Information (1973) provides a framework for understanding the use for higher education outcome information and presents an inventory of outcome variables and measures, as well as a description of how to use that inventory. The outcome variables and measures in the inventory relate to three major outcome areas:

1. Student Growth and Development
2. Development of New Knowledge and Art Forms
3. Community Development and Service

The *Outcome Measures and Procedures Manual (OMPM)* (Micek and others, 1975) presents alternative procedures for acquiring a select number of postsecondary education outcome measures (indicators) that have been identified by a wide range of college administrators and state-level decision makers as being of great importance for helping provide the outcome information needed in carrying out their decision-making responsibilities. While the manual is intended as a practical and flexible guide that can be used by a rather broad audience, it is specifically aimed at those persons involved in educational planning, institutional research, and program evaluation. Some more recent works in the area are: OUTCOMES STRUCTURE: AN OVERVIEW & PROCEDURES FOR APPLYING IT IN POSTSECONDARY EDUCATION, Oscar Lenning, Boulder, Colo. NCHEMS, 1977; STUDENT OUTCOMES QUESTIONNAIRES, Boulder, Colorado, C. P. Bower & N. K. Renkiewicz, NCHEMS, Boulder, Colo., 1977; and, A HANDBOOK FOR USING THE STUDENT OUTCOMES QUESTIONNAIRES, C. P. Bouer & N. K. Renkiewicz, NCHEMS, Boulder, Colo., 1977.

The NCHEMS Costing and Data Management Systems (CADMS) (Haight and Martin, 1975) assists institutions in the implementation of cost studies. The system supports both historical and predictive cost

studies especially the cost portion of the Information Exchange Procedures (IEP) and the Resource Requirements Prediction Model (RPPM). Historical studies require the identification and aggregation of cost-related data in terms of actual units (such as dollars and credit hours). Predictive studies usually represent at institution in terms of historically derived parameters (for example, average section size and faculty rank mix), which then are used as the basis for forecasting costs. The system is composed of the following modules:

1. STUDENT DATA MODULE (SDM) - A module that processes student registration information in order to determine program costs.
2. FACULTY ACTIVITY MODULE (FAM) - A module that converts and aggregates the information obtained from the Faculty Activity and Outcomes Survey Instrument and forwards the information to the Personnel Data Module.
3. PERSONNEL DATA MODULE (PDM) - A module that processes personnel information to calculate crossover instructions used by the Account Crossover Module by linking personnel to the accounts they are paid from and to the tasks they perform.
4. ACCOUNT CROSSOVER MODULE (ACM) - A module that processes the accounting information of the institution; it allows information from the institutional accounts bo be converted to a common activity structure.
5. STUDENT OUTCOMES MODULE (SOM) - A module that converts and aggregates the information from the Student Outcomes Questionnaire for Program Completers and forwards the information to the Data Management Module.
6. DATA MANAGEMENT MODULE (DMM) - A module that is a storage and manipulation mechanism for information obtained from

the Account Crossover Module, Personnel Data Module, Faculty Activity Module, Student Data Module, and the Student Outcomes Module.

Profiles of Management Information Uses (1974) describes the experiences of 12 colleges and universities in applying management information systems during the 1973 pilot test of NCHEMS' Information Exchange Procedures. Pepresentatives of these 12 institutions were asked to document:

1. What specific portions of the information or data items made available through the pilot test were most useful?
2. Who used the data?
3. What specific decisions were affected or what actions resulted?

Virtually hundreds of institutions have used NCHEMS costing and outcomes concepts in the management and evaluation of their institutions.

PERC - Essence and Origin

PERC (Program Effectiveness and Related Costs). The research strategy described in the PERC Handbook (Palola & Others, 1977) is revolutionary in that it focuses first on program effectiveness and then asks, how much does the program cost? The phrase "program effectiveness and related costs" is not simply a euphemism for cost/effectiveness evaluation; it is a wholly new approach to educational research that enables decision-makers to gauge not just the cost of a program in relation to the costs of other programs but also the cost of a program *in relation to the educational effectiveness of that program.*

The *Handbook* itself is a "how-to-do-it" set of definitions, instruments and procedures, all of which have been tested both for their effectiveness and for their adaptability. The PERC research strategy is based on *multiple perspectives:* multiple observers, multiple methods, multiple standards, multiple decision-makers, and multiple time periods. This strategy is fully explained in the *Handbook* so that researchers in the variety of institutional types - large, small; public, private; campus-based, extended - may be able to adapt and use the PERC model.

PERC is intended to provide substantive data about program effectiveness and related costs for administrative and faculty decision-making. Further, the PERC instruments can be adapted to be responsive to the particular mission and role of the institution in question. Educational institutions can thus study program effectiveness that is defined in terms important to the institution: PERC does not establish standards but rather presents instruments that may be molded to a specific institution's standards.

Data that is relevant to an institution can inform decision-making, priority-setting, and future planning. And institutional research need no longer be conducted in a vacuum.

The PERC strategy was developed and tested at Empire State College, the nonresidential unit of State University of New York. HEW, Fund for the Improvement of Postsecondary Education, which funded PERC during its first three years, recognized not only the value of program-effectiveness studies but also the unique opportunity presented by a new and alternative institution. Founded in 1971 to create new structures and substance in order to provide and test more effective educational alternatives for individuals of all ages,

Empire Sate represented a chance to start afresh with a new vision of institutional research and to follow from the beginning the programs and progress of an educational institution.

PERC is now being used not only at Empire State but also at the University of Wisconsin-Green Bay, Hampshire College (Amherst, Massachusetts), State University College at Plattsburgh, and Northland College (Ashland, Wisconsin). These institutions were carefully chosen by the Empire State research team to test the *adaptability* of the PERC model. The range of institutional types is represented by these institutions, and they are finding that the PERC strategy works for them.

Several other institutions are also using parts of PERC. These institutions include: College of New Rochelle, New York Institute of Technology, Marymount Manhattan College, State University Center at Binghamton, New College at Hofstra University, as well as others.

Based on experience to date, any institution can use PERC. First, the *Handbook* itself details the research strategy and provides examples of how other institutions have adapted the PERC instruments to their own situations. Second, the instruments and procedures are being tested - and are proving workable - at a variety of institutions. And third, PERC is modular. It is not necessary to engage in the total program at once. One can choose a recipe or two from the *PERC Handbook* and base future selections from the results of the initial studies.

For example, if student attrition is a particular concern, one might begin with the Student Attrition Questionnaire and related tools. The findings from this specific study will suggest future lines of inquiry. Or, as another example, one might single out a

specific program on which to try the entire, systematic program of research. The PERC research model presents many options and enables institutions to build from it acccrding to their own needs.

The PERC Handbook consists of five chapters plus appendixes.

Chapter 1 gives an overview of the complete PERC framework. It discusses research design and instruments, sampling, strategies for PERC analysis, and data dissemination. This chapter will be useful especially for people who want a cursory look at the framework, its rationale, the instruments, and some uses.

Chapter 2 discusses key dimensions of PERC including its multiple perspectives strategy, goal-outcome-cost relationship, and effectiveness.

Chapter 3 is a tool box of instruments and discussions of how to adapt and use them. Each section describes a single research tool, when it is administered, to whom, why, and what it will require in terms of staff, time and direct costs. The chapter also includes suggestions on goal identification and sampling.

Chapter 4 describes some of the optional ways to look at the relationships suggested in the PERC framework, some tactics for research analysis, and some illustrative analyses.

Chapter 5 looks at data application and use, and provides illustrations with actual PERC data.

Two other key documents - The Methodolgy of PERC (Palola and Others,1977) and The Uses of PERC (Palola and Others, 1978) were published subsequent to the Handbook. In Methodology, a plan and step-by-step procedure is described for managing the multi-dimensional data generated with PERC's use. A major discussion is presented on the reliability and validity of selected PERC data collection instruments. The Uses of PERC provides information about how other institutions have adapted PERC instruments and procedures. Emphasis

is given to illustrations of how PERC data handles specific institutional policy questions. PERC is currently used by public and private, 2- and 4-year and graduate level institutions.

CONTRASTING CAPABILITIES

This section is structured with purpose in mind. A framework for viewing PERC and NCHEMS needs to be constructed. Such a framework would allow potential users to see and understand rather easily the capabilities of either system. Ideally users would match capabilities with local needs, and move ahead.

Below we briefly tick off several capabilities for the two models. No detailed discussion follows, but rather in a later paper key points can be developed in detail. The effort now is acquaint all with the terrain. Current capabilities boil down to the following:

1. Evaluation Intent

The PERC model seeks individualized evaluation which speaks primarily and directly to institutional policy needs and issues. Cross-institutional comparisons are of secondary interest, although possible. Thus we might label the PERC capability as "individualized evaluation."

NCHEMS, on the other hand, uses a cross-institutional format. Categories, data, and analysis techniques speak to local needs while providing for cross-institutional comparison capability. This capability we might label "standardized evaluation."

2. Academic Program Operation

The NCHEMS model allows analysis to obtain a profile of courses taken for individual graduates. Patterns can be discerned for different majors, and costs can be studied.

PERC was designed at Empire State College; its data-collection and analysis techniques allow one considerable capability to

examine individualized learning in detail. Learning contracts, Portfolios of prior learning, evaluation reports, and student products are analyzed for content and evidence of learning.

3. Faculty Roles in Student Learning

PERC examines faculty and their role in the learning process. Frequency and nature of contact with students is examined. In addition, this model has capability to study the professional and personal development of individuals in such new faculty roles as "mentor."

The NCHEMS system does not look at faculty in the same way, but instead gathers data about faculty use of time.

4. Student Diversity

Through NCHEMS, students are examined in a before/after format regarding program expectations and accomplishments in five broad areas. This is part of the outcome analysis procedure.

PERC's interest also begins with entering students. The Student Biographical Inventory collects background information on several topics. Subsequent questionnaires assess student reactions to different program features and provide periodic readings on intellectual and personal progress.

5. Range of Data Collected

A key feature of PERC is its "multiple perspectives strategy". This pluralistic strategy calls for the collection of data on student learning from a variety of points of view - students, faculty, accreditors, external faculty - and the use of multiple methods of data collection - tests, questionnaires, rating forms, observation, content analysis.

In NCHEMS system, existing institutionally-kept financial data inputs to their cost analysis; registrar records provide course sub-

scription data; and, questionnaires to entering and graduating students collects outcome data.

6. Performance Standards

The NCHEMS model allows for the use of standardized, national norms for cost comparisons. Outcome data is interpreted mainly within the context of individual institutions.

By contrast, PERC seeks the use of multiple standards and encourages decision-makers to view program success from alternative perspectives. All persons cannot agree on "what's good", so why not let it speak his view and defend it.

7. Outcome/Costs Relationships

NCHEMS began in the cost analysis arena, and has developed highly sophisticated system analysis techniques and computer programming packages. Only in the last few years has their work pushed outcome analysis. Thus the whole approach to costs, outcomes, and the relationship between the two has not been clearly defined by NCHEMS.

PERC was initiated to work directly on ways to study the relationship between outcomes and costs. First attention in PERC goes to the measurement of student intellectual and personal development outcomes. Cost analysis follows and is framed in a manner consistent with the academic program. Linkages between outcomes and costs are constructed for individual students using their own program as the connective tissue between outcomes and costs.

8. Application Experience

NCHEMS is an older evaluation system than PERC and therefore has had wider and fuller application at various institutions and statewide coordinating agencies. In a sense, much more is known today about NCHEMS strengths and weaknesses. Collective information

about these strengths and weaknesses is valuable to practicing administrators.

In addition to PERC's use at ESC, this evaluation strategy has been used by different types of institutions: private-nontraditional, Hamphsire College; private-traditional, Northland College; public-traditional, State University College at Plattsburgh; and public-traditional-nontraditional, University of Wisconsin, Green Bay. Several other college and universities across the nation are also adapting and applying PERC.

9. Computer System Support

Again, because of NCHEMS longer history, a sophisticated computer program has been developed and works for the NCHEMS cost analysis system. NCHEMS has, in conjunction with CEEB, recently developed a software package that analyses data collected through using NCHEMS' outcomes questionnaires. Most computer work on PERC has been done on outcomes, and this involves establishing computer data files plus use of the SPSS analysis package. Yet to be computerized is the PERC cost model.

10. Flexibility to New Program Formats

PERC was designed and developed at ESC, an alternative education institution which offers individualized education through learning contracts. PERC focuses on the academic work, progress, and outcomes of individual students. Outcomes and costs are studied for each student, and summed by area of study. Thus comparisons can be made for the institution as-a-whole, areas of study, and individual student study programs.

NCHEMS, by comparison, was designed for the traditional course, major, department, college/school and institutional studies and comparisons. Both PERC and NCHEMS are adaptable to different environ-

mental/institutional/administrative requirements, but it is of some importance to be aware of the origins of the two evaluation models.

CONCLUDING COMMENT

It has been the intent of this paper to emphasize or reinforce the need of institutions/programs to regularize their evaluation processes. Further, we have attempted to systematize current learnings about the characteristic features of two currently popular evaluation models -- PERC and NCHEMS. And finally, we urge administrative researchers to study carefully the policy issues and questions faced by their institutions, and then to select carefully and apply the evaluation model(s) to deal with local needs.

The time is ripe for achieving a new plateau in evaluation research for administrative decision-making. All of us must press for greater use of data in decision-making, the linking of outcomes and cost data in program evaluation, and the sharing of our respective evaluation experiences.